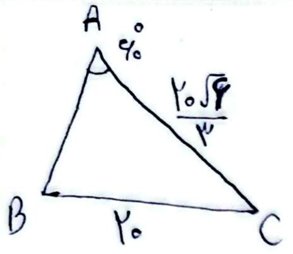
نام و نام خانوادگی ...آرش سلطانی... پاسخنامه تشریحی تکلیف شماره ...۱۳... کلاس ...دوازدهم پسر A

۱

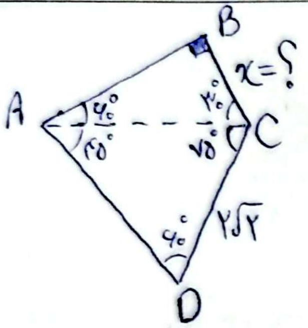


$$\frac{a}{\sin\hat A}=\frac{b}{\sin\hat B}\to\frac{20}{\frac{\sqrt3}{2}}=\frac{\frac{20\sqrt6}{3}}{\sin\hat B}\to\frac{40}{\sqrt3}=\frac{20\sqrt6}{3\sin\hat B}$$

$$\to 6\sin\hat B=3\sqrt2\to\sin\hat B=\frac{\sqrt2}{2}\to\hat B=45^\circ$$

$$\to\hat B+\hat C=45^\circ+\hat C=120^\circ\to\hat C=75^\circ$$

۲

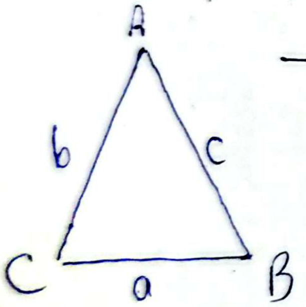


$$\frac{a}{\sin\hat A}=\frac{d}{\sin\hat D}\to\frac{2\sqrt2}{\frac{\sqrt2}{2}}=\frac{d}{\frac{\sqrt3}{2}}\to d=AC=2\sqrt3$$

$\frac{\sqrt3}{2}$ ضلع مقابل به زاویه 60° برابر وتر است

$$\xrightarrow{\triangle \hat{ABC}} BC=x=\frac{\sqrt3}{2}AC=\frac{\sqrt3}{2}\times2\sqrt3=3$$

۳

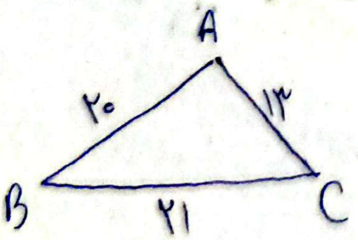


$$\to(b^2-2)\frac{\sin\hat C}{\sin\hat B}=c\xrightarrow{\div\sin\hat C}\frac{c}{\sin\hat C}=\frac{b}{\sin\hat B}=\frac{b^2-2}{\sin\hat B}$$

$$\to b=b^2-2\to b^2-b-2=0\to b=-1 \times \text{غ ق ق} \quad ,\quad b=2 \checkmark$$

۴

با توجه به شکل $\hat B$ زاویه ای تند و Sin و Cos مثبت دارد

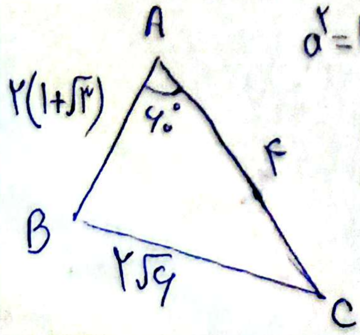


$$\to b^2=a^2+c^2-2ac\cos\hat B\to169=841-840\cos\hat B$$

$$\to-672=-840\cos\hat B\to\cos\hat B=\frac45$$

$$\to\cos^2\hat B+\sin^2\hat B=1\to\sin^2\hat B=\frac{9}{25}\xrightarrow{\hat B<\frac{\pi}{2}}\sin\hat B=\frac35$$

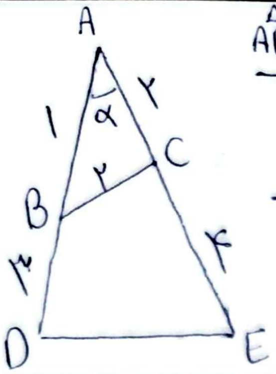
۵



الف) $a^2=b^2+c^2-2bc\cos\underset{60^\circ}{\hat A}\to a^2=16+16+8\sqrt3-8-8\sqrt3=24\to a=2\sqrt6$

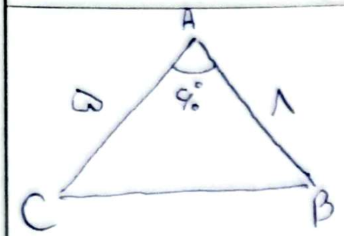
ب) $\frac{a}{\sin\hat A}=\frac{b}{\sin\hat B}\to\frac{2\sqrt6}{\frac{\sqrt3}{2}}=\frac{4}{\sin\hat B}\to4\sqrt2=\frac{4}{\sin\hat B}$

$$\to\sin\hat B=\frac{\sqrt2}{2}\to\hat B=45^\circ\to\underset{60^\circ}{\hat A}+\underset{45^\circ}{\hat B}+\hat C=180\to\hat C=75^\circ$$



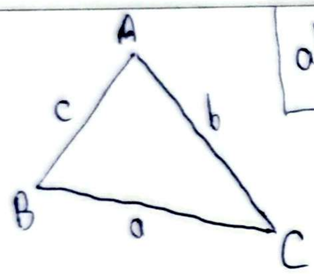
$\overset{\triangle}{ABC} \longrightarrow a^2 = b^2 + c^2 - 2bc\cos\alpha \to 4 = 5 - 4\cos\alpha \to \cos\alpha = \frac{1}{4}$ ۶

$\overset{\triangle}{ADE} \longrightarrow a'^2 = d^2 + e^2 - 2de\cos\alpha \to a'^2 = 36 + 16 - 48(\underbrace{\cos\alpha}_{\frac{1}{4}}) \to a'^2 = 52 - 12 = 40 \to a' = \sqrt{40} = 2\sqrt{10}$



الف) $a^2 = b^2 + c^2 - 2bc\cos 60^\circ = 25 + 64 - 80(\frac{1}{2}) = 49 \to a = 7$

ب) $S_{\overset{\triangle}{ABC}} = \frac{1}{2} bc \sin 60^\circ = \frac{1}{2}(5)(8)(\frac{\sqrt{3}}{2}) = 10\sqrt{3}$ ۷



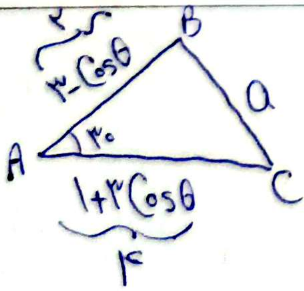
$\boxed{a^2 = b^2 + c^2 - 2bc\cos\hat{A}} \Longrightarrow \frac{(b+c)^2 - a^2}{bc(\cos\hat{A}+1)} = \frac{b^2+c^2+2bc-(b^2+c^2-2bc\cos\hat{A})}{bc(\cos\hat{A}+1)}$

$= \frac{2bc + 2bc\cos\hat{A}}{bc(\cos\hat{A}+1)} = \frac{2bc(\cos\hat{A}+1)}{bc(\cos\hat{A}+1)} = 2$ ۸

$\to a^3 + b^3 - c^3 = a^3 + a^2b - a^2c \to b^3 - c^3 = a^2b - a^2c \to (b-c)(b^2+c^2+bc) = a^2(b-c)$

$\to \underbrace{b^2 + c^2 + bc = a^2}_{b^2+c^2-2bc\cos\hat{A}} \Longrightarrow bc = -2bc\cos\hat{A} \to \cos\hat{A} = -\frac{1}{2}$ ۹

(نمی‌تواند $\frac{3\pi}{2}$ ، $\hat{A}$ ، π باشد) $\hat{A} = 120^\circ$



$\to S_{\overset{\triangle}{ABC}} = \frac{1}{2}(3-\cos\theta)(1+3\cos\theta)\frac{1}{2} = 2$

$\to 3 + 9\cos\theta - \cos\theta - 3\cos^2\theta = 8 \to 3\cos^2\theta - 8\cos\theta + 5 = 0$ ۱۰

$\cos\theta = 1$ ✓

$\cos\theta = \frac{5}{3}$ غ ق ق

$\Longrightarrow a^2 = b^2 + c^2 - 2bc\cos 30^\circ = 16 + 4 - 16(\frac{\sqrt{3}}{2}) = 20 - 8\sqrt{3}$